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1998 Work Zone Crashes
Fact Sheet

INTRODUCTION

The safe and efficient flow of traffic through construction and maintenance work zones is of particular concern to Office of Motor Carrier Safety (OMCS). Almost 30 percent of work zone crashes involve large trucks. Understanding how, where and when work zone crashes occur helps our effort to create effective countermeasures to prevent these crashes in the future.

ABOUT THIS FACT SHEET

This fact sheet presents descriptive statistics for both work zone-related motor vehicle crashes in general as well as work zone-related large truck crashes. In addition to the number of persons injured and killed in work zone crashes, the following information is presented in this fact sheet:

- When do fatal work zone crashes occur: Time of Day, Day of Week, Season (Tables 5-7)
- Where do fatal work zone crashes occur: Roadway Function Class, Speed Limit, Trafficway Flow, Roadway Alignment, Roadway Profile, Relation to Roadway (Tables 8-13).
- How do fatal work zone crashes occur? Number of Vehicles, First Harmful Event, Manner of Collision (Tables 14-16)
- Any driver violations? (Tables 17-18)
- Fatal work zone crashes by State (Table 19)

Tables 5-15 provide comparative data to address the following two questions.

- How do all fatal crashes compare with fatal crashes that occur in a work zone?
- How do all fatal crashes involving at least one large truck (a truck with a gross vehicle weight rating of over 10,000 pounds) compare with fatal crashes that involve a large truck in a work zone?

Statistics presented in this fact sheet for fatal crashes were generated from the National Highway Traffic Safety Administration's (NHTSA) Fatality Analysis Reporting System. Descriptive statistics for nonfatal crashes were generated from NHTSA's General Estimates System.

A work zone crash is defined as a motor vehicle traffic crash that occurred in the vicinity of highway construction, highway maintenance or utility work. The ability to identify whether a crash occurred in a work zone differs from State to State, in large part due to differing interpretations of the definition of a

work zone.

FATALITIES

Table 1
Fatalities in Work Zone Crashes by Person Type, 1994 to 1998

Person Type	1994	1995	1996	1997	1998	5-Year Average	
Motor Vehicle Occupant	700	652	584	600	658	639	84%
Non-Motorist	128	137	133	93	114	121	16%
Total	828	789	717	693	772	760	100%

Source: NHTSA's Fatality Analysis Reporting System

- Over the last 5 years the number of persons killed in motor vehicle crashes in work zones has gone from a high of 828 in 1994 to a low of 693 in 1997, for an average of 760 per year.

- On average from 1994 to 1998, 16% of the fatalities resulting from crashes in work zones were non-motorists (pedestrians and bicyclists).

- In 1998, 772 fatalities resulted from motor vehicle crashes in work zones, about 2% of total fatalities (41,471).

Table 2
Fatalities in Large Truck Work Zone Crashes by Person Type, 1994 to 1998

Person Type	1994	1995	1996	1997	1998	5-Year Average	
Truck Occupant	23	21	23	17	32	23	12%
Other Vehicle Occupants	165	151	128	140	165	150	75%
Non-motorist	33	29	25	21	25	27	13%
Total	221	201	176	178	222	200	100%

Source: NHTSA's Fatality Analysis Reporting System

- In 1998, 222 fatalities resulted from large truck crashes in work zones, about 4 % of fatalities in large truck crashes (5,374).

- Twenty-nine percent of work zone fatalities that occurred in 1998 resulted from large truck crashes (222 out of 772).

- From 1994 to 1998, an average of 200 people were killed in large truck crashes in areas designated as work zones, from a high of 222 deaths in 1998 to a low of 176 deaths in 1996.

- In large truck work zone crashes for this time period, 13% of the fatalities were non-motorists.

INJURIES

Table 3

Persons Injured In Work Zone Crashes by Person Type, 1995 to 1998*

Person Type	1995	1996	1997	1998	4-Year Average	
Motor Vehicle Occupant	40,000	36,000	35,000	38,000	37,000	97%
Non-Motorist	2,000	1,000	1,000	1,000	1,000	3%
Total	42,000	37,000	36,000	39,000	38,000	100%

Source: NHTSA's General Estimates System

* Work zone variable was not available prior to 1995.

NOTE: Estimates rounded to nearest thousand

Table 4

Persons Injured In Large Truck Work Zone Crashes by Person Type, 1995 to 1998*

Person Type	1995	1996	1997	1998	4-Year Average	
Motor Vehicle Occupant	2,000	2,000	3,000	3,000	3,000	100%
Non-Motorist	**	**	**	**	**	**
Total	2,000	2,000	3,000	3,000	3,000	100%

Source: NHTSA's General Estimates System

* Work zone variable was not available prior to 1995.

** less than 500 injured persons

NOTE: Estimates rounded to nearest thousand

- Approximately 39,000 people were injured as a result of motor vehicle crashes in work zones in 1998, about 1% of total injured persons in motor vehicle crashes (3,192,000).

- Approximately 3,000 people were injured in large truck work zone crashes in 1998, about 2% of persons injured in large truck crashes (127,000).

- About 8% of persons injured in work zone traffic crashes (3,000/39,000) were injured in large truck crashes.

WHEN?

Table 5

Fatal Crashes by Time of Day and Work Zone, 1998

Time of Day	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Night	18,547	50%	287	42%	1,448	32%	51	28%
Day	18,534	50%	394	58%	3,113	68%	134	72%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- More than half of all fatal work zone crashes occurred during the day (58%), while about three-quarters of fatal large truck work zone crashes occurred during the day (72%).

Table 6

Fatal Crashes by Day of Week and Work Zone, 1998

Day of Week	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Weekend (Sat & Sun)	12,420	34%	187	27%	681	15%	27	15%
Weekdays (Mon-Fri)	24,645	66%	494	73%	3880	85%	158	85%
Unknown	16	0%	0	0%	0	0%	0	0%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- Almost three times as many work zone crashes occurred on weekdays compared to weekends. However, there are 5 days in a week versus 2 days on a weekend. Based on the number of fatal crashes in work zones per day, only *slightly* more fatal crashes occurred in work zones on the weekdays (494/5=99 vs.187/2=94). For large trucks, almost six times as many fatal crashes occurred on weekdays.

WHEN?

Table 7

Fatal Crashes by Season and Work Zone, 1998

Season	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Winter	8,585	23%	90	13%	1,084	24%	27	15%
Spring	8,585	23%	163	24%	1,035	23%	42	23%
Summer	10,166	28%	242	36%	1,248	27%	67	36%
Fall	9,745	26%	186	27%	1,194	26%	49	26%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- Fatal work zone crashes, regardless of whether a large truck was involved or not, occurred most often in the summer and the fall. This may be the result of most work zones being set up in the summer and the fall.

WHERE?

Table 8

Fatal Crashes by Roadway Function Class and Work Zone, 1998

Roadway Function Class	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Rural-Interstate	2,591	7%	115	17%	607	13%	41	22%
Rural-Other	18,965	51%	268	40%	2,417	53%	72	39%
Urban-Interstate	2,026	6%	97	14%	446	10%	37	20%
Urban-Other	12,767	34%	192	28%	1,028	23%	34	18%
Unknown	732	2%	9	1%	63	1%	1	1%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- The majority of fatal motor vehicle crashes, regardless of the vehicles involved or whether it occurred in a work zone or not, occur in rural areas. Based on data from Highway Statistics, only 39% of all vehicle miles traveled are on rural roads and 58% of truck travel is on rural roads.

- The percentage of fatal work zone crashes occurring on urban Interstates was more than twice the percentage of all fatal crashes occurring on urban Interstates (14% compared to 6%). For fatal large truck crashes, the percentage of work zone crashes occurring on urban Interstates was twice as high compared to all fatal large truck crashes (20% vs. 10%).

Table 9

Fatal Crashes by Speed Limit and Work Zone, 1998

Speed Limit	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
1-50 mph	16,783	45%	259	38%	1,301	28%	48	26%
55-75 mph	19,299	52%	402	59%	3,186	70%	132	71%
Unknown	999	3%	20	3%	74	2%	5	3%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- The majority of fatal work zone crashes for all vehicles and large trucks occurred on roads with speed limits of 55 miles per hour or greater (59% and 71%, respectively).

WHERE?

Table 10

Fatal Crashes by Traffic Flow and Work Zone, 1998

Traffic Flow	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Not Divided	24,712	67%	336	49%	2,639	58%	76	41%
Median-No Barrier	8,887	24%	224	33%	1,360	30%	63	34%
Median w/Barrier	2,749	7%	101	15%	504	11%	42	23%
Unknown	733	2%	20	3%	58	1%	4	2%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- Although the majority of fatal large truck crashes occurred on roads that are not divided (58%), the majority of work zone fatal large truck crashes occurred on roads that are divided (34% + 23%=57%).

Table 11

Fatal Crashes by Roadway Alignment and Work Zone, 1998

Roadway Alignment	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Straight	27,663	75%	580	85%	3,746	82%	167	90%
Curve	9,206	25%	100	15%	807	18%	17	9%
Unknown	212	0%	1	0%	8	0%	1	0%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- The vast majority of fatal crashes occurred on straight roads (75%), regardless whether there is a work zone present (85%), a large truck involved (82%), or both (90%).

WHERE?

Table 12

Fatal Crashes by Roadway Profile and Work Zone, 1998

Roadway Profile	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Level	25,753	70%	509	75%	3,235	71%	139	75%
Grade	9,275	25%	147	21%	1,128	25%	38	21%
Other /Unk	2,053	5%	25	4%	198	4%	8	4%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- About three times as many fatal crashes occurred on level roadways than nonlevel roads, regardless if there is a work zone present or a large truck involved.

Table 13

Fatal Crashes by Relation to Roadway and Work Zone, 1998

Relation to Roadway	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
On Roadway	22,171	60%	457	68%	3,970	87%	159	86%
Off Roadway	14,751	40%	216	32%	588	13%	26	14%
Unknown	159	0%	8	0%	3	0%	0	0%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- While 50% more fatal work zone crashes involving all vehicles occurred on the roadway compared to off the roadway, more than 6 times as many fatal large truck work zone crashes occurred on the roadway compared to off the roadway (86% vs. 14%).

HOW?

Table 14

Fatal Crashes by Number of Vehicles Involved and Work Zone, 1998

Number of Vehicles Involved	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
One	20,897	56%	331	49%	808	18%	38	21%
Two	13,697	37%	263	39%	3,013	66%	109	58%
More than 2	2,487	7%	87	12%	740	16%	38	21%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- While the majority of all fatal crashes involved only one vehicle (56%), the majority of large truck fatal crashes occurring in work zones involved two or more vehicles (58%).

- Roughly 80% of fatal large truck crashes involved two or more vehicles, regardless of whether a work zone was present.

Table 15

Fatal Crashes by First Harmful Event and Work Zone, 1998

First Harmful Event Collision With:	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Motor Vehicle in Transport	15,292	41%	315	46%	3,549	78%	133	72%
Fixed Object	10,882	29%	140	21%	336	7%	17	9%
Pedestrian	4,893	13%	90	13%	298	7%	17	9%
Non-Collision	4,093	11%	72	11%	225	5%	9	5%
Not Fixed Object		5%	64	9%	152	3%	9	5%
Total	37,081	100%	681	100%	4,561	100%	185	100%

Source: NHTSA's Fatality Analysis Reporting System

- Most large truck fatal crashes, regardless of whether in a work zone or not, occurred as a result of a collision with another moving vehicle.

HOW?

Table 16

Two-Vehicle Fatal Crashes by Manner of Collision and Work Zone, 1998

Manner of Collision	Fatal Crashes	%	Fatal Work Zone Crashes	%	Fatal Large Truck Crashes	%	Fatal Large Truck Work Zone Crashes	%
Rear-end	1,896	12%	98	31%	727	20%	56	30%
Head-on	5,243	34%	97	31%	1,072	30%	29	16%
Angle	7,489	49%	103	33%	1,525	43%	37	2%
Side-Swipe: Same direction	351	2%	11	4%	108	3%	9	5%
Side-Swipe: Opp direction	248	2%	5	2%	100	3%	2	0%
* Not Applicable/Unknown	21,854	1%	367	0%	1,029	***1%***	52	28%
Total	37,081	100%	681	100%	4,561	100%	185	100%

* Includes all crashes that do not involve two vehicles.
Source: NHTSA's Fatality Analysis Reporting System

- The most common manner of collision for all two-vehicle fatal work zone crashes was an angle collision (33%), followed closely by rear-end (31%) and head-on (31%).

- For two-vehicle large truck fatal work zone crashes, the most common manner of collision was rear-end (30%).

DRIVER

Table 17

Drivers Involved in Multi-Vehicle Fatal Truck-Related Crashes by Driver Type, Violations Charged and Work Zone, 1998

Violations Charged	Truck Driver Fatal Crashes	%	Other Driver Fatal Crashes	%	Truck Driver Fatal Work Zone Crashes	%	Other Driver Fatal Work Zone Crashes	%
Yes	548	13%	283	6%	30	17%	9	4%
No	3,532	87%	4,352	94%	141	83%	195	96%

Source: NHTSA's Fatality Analysis Reporting System

- Only a minority of drivers involved in multiple-vehicle fatal truck-related crashes were charged with violations. The proportion of truck drivers involved in fatal crashes that were charged with violations was similar regardless of whether the crash occurred in a work zone (13%) or not (17%). The same was true for drivers of the other vehicle involved: 4% in fatal work zone crashes, 6% for all fatal crashes.

Table 18

Drivers Involved in Single-Vehicle Fatal Crashes by Driver Type, Violations Charged and Work Zone, 1998

Violations Charged	Fatal Truck Crashes	%	Non-Truck Fatal Crashes	%	Fatal Truck Crashes in Work Zones	%	Non-Truck Crashes in Work Zones	%
Yes	68	8%	2,770	14%	3	8%	46	16%
No	735	92%	17,227	86%	35	92%	245	84%

Source: NHTSA's Fatality Analysis Reporting System

- The proportion of large truck drivers charged with a violation in single-vehicle crashes was less than the proportion for other drivers, regardless of whether the crash occurred in a work zone or not.

Table 19 **1998 Fatalities by Work Zone and Large Truck Involvement (FARS)**

	TOTAL FATALITIES		FATALITIES IN LARGE TRUCK CRASHES	
STATE	**TOTAL**	**WORK ZONE**	**TOTAL**	**WORK ZONE**
Alabama	1,071	13	158	6
Alaska	71	1	2	0
Arizona	980	37	125	1
Arkansas	625	22	109	10
California	3,494	68	378	19
Colorado	628	13	61	9
Connecticut	329	6	28	1
Delaware	115	5	17	4
Dist. of Columbia	54	1	1	1
Florida	2,824	27	356	6
Georgia	1,569	68	221	22
Hawaii	120	3	3	1
Idaho	265	1	28	0
Illinois	1,393	20	183	6
Indiana	978	33	180	13
Iowa	449	6	94	3
Kansas	493	17	87	6
Kentucky	858	4	111	0
Louisiana	922	11	155	3
Maine	192	2	23	0
Maryland	606	14	62	0
Massachusetts	406	2	34	0
Michigan	1,367	10	157	0
Minnesota	650	9	86	4
Mississippi	948	5	127	5
Missouri	1,169	19	183	9
Montana	237	5	21	1
Nebraska	315	16	44	4
Nevada	361	7	38	2
New Hampshire	128	1	10	0
New Jersey	743	10	63	3
New Mexico	424	12	46	6
New York	1,498	20	147	4
North Carolina	1,596	14	243	10
North Dakota	92	4	11	0
Ohio	1,422	19	202	4
Oklahoma	755	19	136	2
Oregon	538	14	75	5
Pennsylvania	1,481	11	181	4
Rhode Island	74	1	3	0
South Carolina	1,002	3	128	0
South Dakota	165	4	15	0
Tennessee	1,216	29	127	6
Texas	3,577	125	477	25
Utah	350	1	49	0
Vermont	104	1	9	0

Virginia	935	4	125	1
Washington	660	5	72	1
West Virginia	354	7	43	2
Wisconsin	714	15	107	9
Wyoming	154	8	33	4
Total	41,471	772	5,374	222

***SUMMARY*:**

Of the 41,471 fatalities in motor vehicles crashes in 1998, about 2% occurred in work zone areas. However, 29% of the fatalities in work zone crashes involved large trucks. Of the 3.2 million persons injured in non-fatal motor vehicle crashes in 1998, about 1% occurred in work zones. About 8% of persons injured in work zone crashes were injured in large truck crashes. Fatal crashes in work zones were similar to all fatal crashes for the most part. However, there are some differences.

The descriptive statistics about work zone crashes presented in this fact sheet are not exhaustive. However, they do provide an understanding of the basic characteristics of these crashes.